Chapter 1

Introduction to the ASN.1 Compiler

The purpose of the ASN.1 compiler, of which t
specifications in ASN.1 notation into some oth
and C++ target languages are supported, the la

The compiler reads the specification and emits

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Overall Options	Description

Chapter 2

Using the ASN.1 Compiler

2.1 Invoking the ASN.1 helper code

der_encoder This is the generic DER encoder (Distinguished Encoding Rules). This encoder will take the target structure and encode it into a series of bytes. Please

- You may feed it the first buffer of 100 bytes of data, realize that the ber_decoder consumed only 95 bytes from it and later feed the decoder with 205 bytes buffer

Note that the initial (asn_DEF_Rectangle->ber_decoder) reference is gone, and also
the last argument (0) is n530 9tnge0(Ar(is)-25ecessary)65(.lso)]14.944J 02.07.755 TThes(the)-2tw0(n530 w)10(a

```
er = xer_encode(&asn_DEF_Rectangle, rect,
    XER_F_BASIC, /* BASIC-XER or CANONICAL-XER */
```

the other hand, the successful decoding of the data from some external source does not necessarily mean that the data is fully valid either. It might well be the case that the specification describes some subtype constraints that were not taken into account during decoding, and it would actually be useful to perform the last check when the data is ready to be encoded or when the data has just been decoded to ensure its validity

```
#include <stdio.h>
#include <sys/types.h>
#include <Rectangle.h>   /* Rectangle ASN.1 type  */

/*
 * This is a custom function which writes the
 * encoded output into some FILE stream.
 */
static int
write_out(const void *buffer, size_t size, void *app_key) {
    FILE *out_fp = app_key;
    size_t wrote;

    wrote = fwrite(buffer, 1, size, out_fp);

    return (wrote == size) ? 0 : -1;
}

int main(int ac, char **av) {
    Rectangle_t *rectangle; /* Type to encode        */
    asn_enc_rval_t ec;/* Encoder return value  */

    /* Allocate the Rectangle_t */
```

```
  if(ec.encoded == -1) {
    fprintf(stderr,
      "Could not encode Rectangle (at %s)\n",
      ec.failed_type ? ec.failed_type->name : "unknown");
    exit(65); /* better, EX_DATAERR */
  } else {
    fprintf(stderr, "Created %s with BER encoded Rectangle\n",
      filename);
  }
}

/* Also print the constructed Rectangle XER encoded (XML) */
xer_fprint(stdout, &asn_DEF_Rectangle, rectangle);
```

3.2 A ”Rectangle” Decoder

This example will help you to create a simple BER decoder of a simple ”Rectangle” type used throughout this document.

1.

6. Compile all files together using C compiler (varies by platform):

```
cc -I. -o rdecode *.c
```

7. Voila! You have just created the BER decoder of a Rectangle type, named **rdecode**!

Chapter 4

Constraint validation examples

This chapter shows how to define ASN.1 constraints and use the generated validation code.

4.1 Adding constraints into ”Rectangle” type

s;

Chapter 5

Abstract Syntax Notation: ASN.1

This chapter defines some basic ASN.1 concepts and describes several most widely used types. It is by no meacs an authoritative or complete reference. F(or)-333(mor)37(e)-334(complete)]TJ 0 -11.956 Td[(ASN.

5.1.3 The ENUMERATED type

The ENUMERATED type is semantically equivalent to the INTEGER type with some integer values explicitly named.

```
FruitId ::= ENUMERATED { apple(1), orange(2) }

-- The numbers in braces are optional,
-- the enumeration can be performed
-- automatically by the compiler
ComputerOSType ::= ENUMERATED {
    FreeBSD,          -- acquires value 0
    Windows,          -- acquires value 1
    Solaris(5),       -- remains 5
    Linux,            -- becomes 6
    MacOS             -- becomes 7
}
```

5.1.4 The OCTET STRING type

This type models the sequence of 8-bit bytes. This may be used to transmit some

5.3 ASN.1 Constructed Types

5.3.1 The SEQUENCE type

This is an ordered collection of other simple or constructed types. The SEQUENCE constructed type resembles the C ”struct” statement.

```
Address ::= SEQUENCE {
    -- The apartment number may be omitted
    apartmentNumber      NumericString OPTIONAL,
    streetName           PrintableString,
    cityName             PrintableString,
    stateName            PrintableString,
    -- This one may be omitted too
    zipNo                NumericString OPTIONAL
}
```

5.3.2 The SET type

This is a collection of other simple or constructed types. Ordering is not important. The data may arrive in the order which is different from the order of specification. Data is encoded in the order not necessarily corresponding to the order of specification.

5.3.3 The CHOICE type

This type is just a choice between the subtypes specified in it. The CHOICE type

Bibliography

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